Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

a521
.A83W42

Statement by Jim Williams
Deputy Secretary of Agriculture
before the
Committee on Agriculture, Nutrition and Forestry
Subcommittee on Agricultural Research and General Legislation
Honorable Donald W. Stewart, Chairman
U. S. Senate

July 23, 1979

Mr. Chairman and Members of the Committee, it is a pleasure to appear before you today to discuss USDA energy policy matters, particularly gasohol and our industrial hydrocarbon and alcohol pilot project program.

At the outset I would like to provide you with a perspective of the Department of Agriculture's overall energy role. In testimony on July 26, 1978 before the Subcommittee on Rural Development of the Senate Committee on Agriculture, Nutrition and Forestry Secretary Bergland outlined several goals in pursuit of which the Department conducts its energy programs. The Department's energy goals, which remain basically unchanged are:

- o Conserve Energy in Agriculture and Rural Areas, Including USDA Internal Operations
- o Develop and Apply Alternative Sources of Energy
- o Assure Essential Energy Supplies for Agriculture
- o Minimize Adverse Impacts on Agricultural and Rural Lands and Communities, and
- o Minimize the Impacts of Rising Energy Prices or Supply Constraints on Agriculture and Rural America.

The Secretary proposed the following targets in support of these goals for the year 1990:

- o Agricultural production--net energy self-sufficiency, under conditions that sustain productivity;
- o Forest production and processing--net energy self-sufficiency, under conditions that sustain productivity.

These targets will be pursued through a combination of: (1) energy conservation, or management, (2) extensive technology transfer programs, and (3) incentives to foster adoption. We believe these self sufficiency targets can be met by a concerted effort to conserve energy in agricultural and forestry activities and to develop and use alternative energy sources.

The U.S. food, natural fiber and forest products system has been dependent on the world community for its critical inputs of fossil fuels. We are experiencing impacts in agriculture of energy supply disruptions and sharp price increases attendant with this dependence. By moving toward energy self-sufficiency, agriculture can reduce the vulnerability of food and fiber producers and consumers to resultant price increases. Development of renewable energy sources will have the potential to help stabilize energy prices, thus reducing inflationary effects, and will help stem the outflow of dollars spent for imported oil. Energy from agriculture can contribute to a strong and secure national economy.

Some examples of energy conservation practices that we would like to see in extensive use on American farms include:

- o Reduced tillage - a net energy savings of 1-3 gallons of diesel fuel per acre can be achieved through this practice

- o Soil testing - which may result in more efficient use of fertilizer
- o Improved irrigation efficiency - to reduce energy consumed in irrigation
- o Reduced energy for crop drying

Solar heating applications have a promising potential in farm homes and in livestock shelters, greenhouses, water systems, and crop and lumber drying.

In FY 1979 some 110,000 single family and 32,000 multifamily units were financed through Farmers Home Administration, with conservation of energy a major consideration. New stringent thermal standards have been in effect since March 1978. Use of solar energy to provide space and hot water heat for residences is being demonstrated now by FmHA in homes in Maine, Virginia, and New Mexico. Three other homes in North Dakota, Illinois and Oklahoma are scheduled to be retrofitted under this program. The FmHA has constructed well over 200 other housing units utilizing either passive or active solar systems. The majority of the systems are for heating water for which solar units now appear to be cost effective with electricity in some areas. Since March 1979, loans for wood burning equipment have been available.

A pilot solar grain drying loan program was initiated in October 1978 in portions of 10 States by the Agricultural Stabilization and Conservation Service (ASCS). This program was not well subscribed, however, due in part to the late announcement and the primary emphasis on grain drying. Since grain drying occurs mainly from September through November the drying system was unused for the bulk of the year. Now, a Nation-wide program for more economic use of solar facilities is being implemented involving multipurpose systems

that will not only dry grain but also heat livestock structures such as poultry houses and swine farrowing barns, and other farm buildings including the farm home. This would save considerable fossil fuel and reduce the unit cost of solar equipment use.

The area which promises by far the largest contribution toward achieving net energy self-sufficiency for agriculture and forestry by 1990 is fuels from biomass, including gasohol. Agricultural production and forestry production and processing together consume 6.2 percent of the Nation's energy, or 4.7 quads. Presently, wood residues account for 1.2 quads--almost half of the energy used in forest production and processing. To achieve a net energy self sufficiency based on biomass alone, we estimate that an additional 4 quads of energy will have to be produced. With the ultimate energy potential of biomass estimated to be well above 10 quads, the 1990 objective of net energy self sufficiency for agriculture and forestry appears to be achievable.

With regard to the use of wood for energy, DOE has identified wood combustion as an area ready for commercialization. Of all the various energy feedstocks, we view woody biomass as having the greatest potential toward achieving the goals of energy self sufficiency that I mentioned earlier. In his May 4 Iowa address, President Carter pointed out that throughout the government, projects are being undertaken to enable us to improve our use of forests for energy, particularly the wood that is now being wasted.

USDA has set a goal of establishing through the Forest Service, by the end of next fiscal year, twenty demonstrations for use of wood as a fossil fuel substitute. These demonstrations will encompass a variety of uses of wood energy, including space heating for homes and buildings, industrial uses, and electric generation and co-generation. They will be carefully selected for economic feasibility, and in the aggregate will utilize a volume of wood biomass capable of producing .05 quadrillion BTUs of energy.

One wood-energy demonstration project is now in place in Oregon, where large volumes of timber have been killed by insects. Energy products are being given a high priority during the salvage of this dead timber, resulting in wood chips being marketed to local industries for boiler fuel. The USDA and DOE are cooperating on this project.

Another wood-energy pilot project involving ASCS and Forest Service was started in April 1979 in four New England states. Eighty thousand cords of fuelwood are scheduled for removal, equivalent to 240,000 barrels of oil. Technical assistance for tree marking and trail building is being supported by Agricultural Conservation Program funds. State and U.S. foresters will provide supervision and help landowners market the fuelwood.

Methane produced by anaerobic digestion is another biomass energy source of particular interest to agriculture. FmHA has a commitment to loan $14 million for a Colorado project that will convert feedlot wastes to methane for municipal energy use.

More recently, serious discussions have been started regarding possible loans for methane digesters in connection with dairy, hog, feedlot, and other farm operations. Presently, FmHA is providing the necessary engineering feasibility studies for these projects. Proposals have been received from Iowa, Pennsylvania, Alabama, Idaho, Arizona and Maryland. The earlier projects will be monitored after they are in place in order to provide a basis for decisions on further implementation of the loan program.

Methane extracted from coal beds is also of interest to agriculture because of its potential wide availability in rural areas. USDA, through the FmHA and DOE are now working with the Greene County Land Owners Association in south-western Pennsylvania to determine feasibility of extracting methane for possible use for peak loads in local utilities or in natural gas lines.

Of particular interest now is the potential for producing liquid fuels, especially alcohol, from agricultural and forest raw materials. We see this progressing in two distinct ways -- through commercial plants or farm co-ops that would produce anhydrous alcohol for general use in gasohol and through small scale on-the-farm production of alcohol for use in farm vehicles and machinery.

The Department of Agriculture vigorously endorses development of gasohol as an energy resource. We believe that such development should utilize a diversity of agricultural and forest materials as feedstocks and should be structured to avoid significant impact on food prices and availability of grain for export. Due to uncertainty regarding cropland availability on a dependable basis for fuel alcohol production, any commitment to a grain-based ethanol program should be restricted to an increment of a national gasohol program. Alternative

feedstock possibilities should be vigorously explored and brought to the point of commercial demonstration.

Small scale, on-farm alcohol production would not be aimed at the big market of transportation fuels. It would aim at the 1 quad of liquid fuels used directly on the farm for agricultural production. We are aware of the tremendous interest in this technology, and we want to find answers to such questions as:

1. What are the available technologies for small-scale, on-farm energy systems and what are their economic characteristics?
2. What are the most promising feedstock opportunities?
3. What kinds and sizes of farms are the best locations for using the above technologies?
4. What financial barriers would farms of the above kinds encounter, and what kinds of policy incentives would be required to overcome them?
5. What is the state-of-the-art with respect to the utilization of on-farm produced alcohol in farm equipment and vehicles?
6. What kinds of technical assistance would farmers need to make good use of public resources in this area?

USDA in cooperation with DOE hopes to have answers to these kinds of questions later this year. This will provide guidance for lending activities by the Farmers Home Administration for small scale alcohol production facilities.

The State offices of FmHA are now considering loan applications for small scale alcohol plants on a limited basis, and have awarded one loan of $140,000 for an alcohol plant on a farm near Ethington, South Dakota. FmHA can use its farm ownership, farm operating, and B&I loan authorities for small scale alcohol plants. Numerous requests are being received in state offices, but most of these are not being processed at the present time because state allocations of loan funds are committed for this fiscal year.

Finally, I would like to discuss the industrial hydrocarbon and alcohol programs authorized by Congress in Title XIV of the Food and Agriculture Act of 1977. Sections 1419 and 1420 gave USDA authorization to carry out programs in research and pilot testing in production of industrial hydrocarbons and alcohols.

USDA research on industrial hydrocarbons and alcohols has been underway for several years at the Science and Education Administration's Northern Regional Research Center in Peoria, Illinois. This includes in FY 1979: (1) more efficient preparation of the substrate (starch, residues); (2) innovative fermentation to produce higher yields and higher alcohol concentration at lower costs; (3) multi-use energy crops; and (4) better use of protein by-products.

The research at Peoria is funded at $500,000. Another $500,000 for alcohol and hydrocarbon research is being expended through grants to 6 colleges and universities in New Jersey, Indiana, Georgia, Maryland, Florida, New York, and Alabama.

Section 1420 of the 1977 Act provided that the Secretary carry out a pilot program for the production and marketing of industrial hydrocarbons derived from agricultural commodities and forestry products, for the purpose of

stabilizing and expanding the Nation's supply of industrial hydrocarbons. The Secretary was authorized to support four pilot projects for the production of industrial hydrocarbons and alcohols from agricultural commodities and forest products by guaranteeing loans, not to exceed $15,000,000 for each project.

A significant feature of this legislation is the requirement that no loan may be guaranteed unless research indicates the total energy content of the products and byproducts will exceed the total energy input from fossil fuels used in the manufacture.

Our first step in implementing Section 1420 was a request in the October 20, 1977 Federal Register, for tentative descriptions of proposed pilot projects. Altogether, 51 responses were received by the April 15, 1978, deadline. The information from these tentative descriptions was used by a panel of technical experts in preparing draft regulations. These were published in the May 12, 1978, Federal Register for a 30-day review period, and during this time, we held public hearings in Washington, D.C., St. Louis, Missouri, and Spokane, Washington. During the review period numerous suggestions were made that were considered by a technical panel in preparing the final regulations. Additional criteria brought out in the review process included: broad applicability, new technological advances, diversity, and favorable environmental implications. The final regulations including a request for proposals were published in the Federal Register on July 11, 1978.

Thirty formal proposals were received by the closing date of October 16, 1978. Twelve involved grain feedstocks, nine sugar crops, eight forest residues, seven agricultural residues, five off-grade agricultural products, three cattle manure and two potatoes. Twenty-three of the proposals were aimed at ethanol production and the rest at low BTU gas, charcoal, pyrolysis oils, methane, fuel pellets, hexane and pentane.

The proposals were examined in detail by staff of the Office of Energy, then reviewed by an evaluation committee consisting of national experts. Additional reviews on specific technologies and projects were provided on our request by a contractor and by the Department of Energy.

Tentative approval was given to four projects by the Commodity Credit Corporation Board at meetings on December 5, January 12, and March 20. Early in its deliberations the CCC Board indicated its wish to emphasize innovative technologies and approaches.

The first project tentatively approved was Enerco, Inc., Langhorne, Pennsylvania which will convert forest and agricultural residues into gas, oil and charcoal for fuel and other uses. This project will involve a number of mobile pyrolysis units located near sources of residues and will provide energy in rural communities. For example, small industries, hospitals and schools could receive fuel from this project. Each pyrolysis unit is expected to produce 60 tons a day of gas, oil and charcoal, with an energy content of 1 billion BTU's. Total annual energy production is estimated to be 13.5 trillion BTU's.

The loan for Enerco is $6,900,000 with a total project cost of $7,800,000. The pyrolysis units involved in this project will be rented or leased to customers, not sold. They have a unique reactor design with indirect reactor heating and are of medium scale. They are also mobile, which lends a unique degree of adaptability to the technology. TVA has purchased one unit for testing purposes, and final approval of the project is contingent on a demonstration of satisfactory performance of the TVA unit.

This project would have very wide applicability throughout the country and would provide a means of increasing the availability of low cost fuels in rural areas and decreasing the reliance of rural communities in fossil fuels. In addition, by consuming 1.9 million tons a year of biomass wastes annually this will result in expansion and diversification of the markets for biomass wastes.

The second project involves the Biomass and SuChem Corporations, subsidiaries of Savannah Foods and U.S. Sugar, respectively. This proposal involves the hydrolysis of sugar cane bagasse to produce ethanol (95 percent) and butanediol. Lignin, hydrogen and methane are also produced and are used in the process for heat generation. The process to be used is one developed in ongoing research at the University of Purdue by Professor George T. Tsao and associates. The proposed plant would be closely associated with a sugar mill (U.S. Sugar) producing about 165,000 tons of bagasse annually, 70,000 tons of which would be used as feedstock.

Since bagasse is viewed as a pure waste product, its use as a feedstock involves no energy charge against the project. This and the use of lignin, hydrogen and methane produced in the process yield a strongly positive energy balance.

There is sufficient waste bagasse in Florida, Louisiana and Hawaii to support several plants of the scale called for in this proposal. Also, the technology developed here for converting cellulosic residue should be adaptable to a wide variety of other residues. The plant is expected to produce annually four and a quarter million gallons each of ethanol and butanediol. The loan guarantee will be $15 million, with a total project cost of $17 million. It is expected that the guarantee commitment provisions will eventually cover an initial pilot and engineering stage at Purdue University, funded at $1.3 million, as well as a commercial-sized plant construction stage.

The third pilot project is Guaranty Fuels of Independence, Kansas to build two plants in North Carolina that would refine forestry and agricultural residues into fuel pellets for direct burning in industrial boilers. The objectives of the project are to convert daily 1,200 tons of wet agricultural and forestry residue to 600 tons (9.7 billion Btu) of clean, homogeneous, transportable, storable, industrial hydrocarbon fuels acceptable for direct combustion. Other goals include utilization of mixes of agricultural and forestry feedstocks, and mixes of livestock and poultry manures with other biomass residues. The fuel pellets produced by this project will be suitable for a wide range of energy uses, including replacement of gas, oil and coal for small to medium-scale steam raising or heating purposes.

Although similar pelletizing technologies are already on the market, this proposal is especially interesting in that it is tied with another innovation developed by the applicant. This is a burner mechanism that enables efficient utilization of the pellets. Taken together, the two technologies offer the potential of widespread applicability, particularly in regions of the country where fuel costs are rising rapidly and there is limited access to energy sources other than natural gas, oil and propane. Total cost of the

project will be $6.5 million, with a loan guarantee of $5.85 million.

The fourth project is Midwest Solvents of Atchison, Kansas. This project, at Santa Rose, Texas, involves an alcohol distillery utilizing fermentation technology to convert sorghum grain (milo) and sugar cane molasses to fuel or industrial-grade alcohol. About 75 percent of the alcohol would be produced from sorghum grain. The distillery would be co-located with a cane sugar plant to utilize excess steam from bagasse burning, and the sugar cane molasses from that plant would constitute 20-25 percent of the distillery's feedstock. An attractive feature of this project is that it will test sweet sorghum as a feedstock, in collaboration with the sweet sorghum research and field testing program at nearby Weslaco, Texas. Sweet sorghum is a potentially attractive energy crop that can be grown widely.

The plant will produce 10 million gallons of fuel-grade or industrial-grade ethanol a year along with distillers dry grain and carbon dioxide byproducts, and will require a loan guarantee of $15 million, with total project cost of $21.9 million.

Final approval of all the projects will be contingent upon satisfying the requirements of the National Environmental Policy Act, completion of USDA procedures for weiging socio-economic impacts of proposed Departmental actions, and execution of satisfactory guarantee commitment and related loan documents and security instruments. We are now working with all four projects on the environmental assessments and are negotiating details of the loan guarantee agreements.

We believe that in order for the pilot project program to be workable the participating firms must be largely free to follow their own timetables in preparing for closing of the loan guarantee agreements. Business decisions must be made in the right sequence and timing in order to be successful and economically acceptable to the firms.

Specifically, final closing of the Enerco agreement is contingent on satisfactory demonstration of a continuous feed auger system on the prototype. Since the design of the multiple project units can't be finalized until this is done, it would be premature to rush the financial arrangements. With the Biomass/SuChem project, it is legally necessary that the financing be structured for a single project to cover both the engineering and plant construction phases of the project prior to releasing guarantee funds for the initial phase. Guaranty Fuels, being a small firm, with little capital, has required additional time to locate compatible financing. Midwest Solvents has had to work out a series of technical, financial and land acquisition problems.

These kinds of problems are to be expected in commercializing innovative technologies, and we do not consider them limiting. However, they do take time and must be allowed for if the projects are to make economic sense to the firms and still meet statutory and regulatory requirements.

Mr. Chairman, that concludes my statement and I will now be glad to answer questions.

U.S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D.C. 20250

OFFICIAL BUSINESS
Penalty for Private Use, $300

POSTAGE & FEES PAID
United States Department of Agriculture
AGR 101